Minutes of the Drinking Water Intake Subcommittee Meeting
July 19-20, 1999

U.S. Environmental Protection Agency
Science Advisory Board
Drinking Water Intake Subcommittee Committee
of the Executive Committee
Public Meeting
July 19-20, 1999
Embassy Suites Hotel Crystal City
1300 Jefferson Davis Highway
Arlington, VA

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Minutes of the Drinking Water Intake Subcommittee of the EPA SAB Executive Committee

July 19-20, 1999

The Drinking Water Intake Subcommittee of the US EPA Science Advisory Board's Executive Committee met from July 19-20, 1999 to review the Environmental Protection Agency's report *Per Capita Water Consumption in the United States* (see Attachment A). The meeting was announced in the Federal Register at FR Vol. 64, No. 115, pp. 32228-32229; June 16, 1999 (see Attachment B). The agenda for the meeting is in Attachment C to these minutes.

Panel members and consultants who were involved in this meeting included Drs. Henry Anderson, Richard Bull, Judy Bean, Cynthia Bearer, John Evans, Anna Fan-Cheuk, Richard Gilbert, Barbara Harper, Michael Jayjock, Kai-Shen Liu, Edo Pellizzari, and Barbara Petersen (see the panel roster at Attachment D). Participating for the Agency were: Drs. Henry Kahn, Julie Du, Ms. Helen Jacobs, and Ms. Kathleen Stralka (contractor from SAIC)(see sign-in sheets at Attachment E for members and public attendees). Mr. Thomas Miller was the Designated Federal Officer and Ms. Dorothy Clark was the Management Assistant for the Subcommittee. An earlier Subcommittee meeting was held to plan this review on July 8, 1999 via public teleconference (see FACA files in the EPA Office of the Science Advisory Board).

MEETING SUMMARY FOR THURSDAY, JULY 19, 1999

8:35am Introductory Remarks of the CoChairs

Drs. Anderson and Bull convened the meeting and noted the flow of the activities for the meeting. At that point, the Cochairs called for the Subcommittee members to introduce themselves and to note for the record their affiliations, any past involvement in activities related to the current Agency product, and any ties to the Agency (e.g., contracting or research funding, etc.). No ties to the Agency project were noted during the process. Additional detail can be located in the DFO's notes which are attached to these minutes (Attachment E). Following these introductions, the Cochairs asked the Agency and public to introduce themselves.

8:45 am **Panel Discussion of the Charge Questions**

The Cochairs noted that the questions would be taken out of order to accommodate the late arrival of Dr. Bean's flight. **The following comments are those made by individual members of the review panel during the meeting. Further discussion occurred leading to the consensus conclusions of the panel that are enumerated later in these minutes and that will be captured in the report the Subcommitee will send to the Agency.**

8:52 am **Charge Question 3:** The CSFII survey is based on short-term survey data. Upper percentile estimates may differ for short-term and long-term data because short-term survey data tends to be inherently more variable. Is it appropriate to report upper percentile estimates such as the 99th percentile?

Dr. Gilbert summarized his premeeting written comments on this question (see Attachment

F). Additional comments made by members included:

a) the need to consider data use in determining whether the two-day period presents problems–it is appropriate for assessing acute exposures,
b) upper percentiles for fine age classes of children is imprecise due to the low numbers in each age class,
c) no consideration of auto-correlation between the two-days data and what that might say about variability in the data,
d) using the term "Daily Average Per Capita Estimates" could be taken to mean a long term average if short to long term variability issue is not clearly described up front in the report,
e) the issue is not whether to report the upper percentiles or not, it is that the report must be clear about what they represent,
f) the Agency should consider using the USDA-NCHS guidance on determining whether a cell's data is usable based on response levels,
g) it is important to clarify that "consumption" refers only to ingestion,
h) it will be important to note the purpose for the ingestion estimates in the report; just attempting a descriptive view of the estimates based on the USDA survey is not enough,
i) short term estimates are appropriate for the microbial estimates that the data will be used to derive later,
j) trying to say more about the variability in the estimates will help users of the descriptive statistics use them appropriately.

Dr. Anderson noted that many of these comments would need to be captured in a general statement because they go beyond the narrow focus of this charge question.

9:35 am **Charge Question 1:** The distributions of estimated water intake were generated using standard statistical methodology for surveys with complex designs such as the 1994-96 CSFII. Is the statistical methodology used to generate the estimates appropriate? Should we consider rounding?

Charge Question 2: We have limited the calculation of confidence intervals about the mean and boot strap intervals for percentiles to the distributions for the larger subpopulations. The complex sample design makes the calculation and interpretation of results for smaller subpopulations virtually impossible to calculate and interpret. Is this an appropriate decision?

Dr. Bean mentioned her preliminary remarks for both these questions (see Attachment F). The issue of small sample size in many classes was noted. Aggregating estimates at a larger level was suggested as a possibility. Other comments from panelists included:

a) the survey's requirement for reporting direct intake may have biased the estimates derived by the Agency,
b) the possibility of attempting to fit the data to a curve was suggested,
c) there is an appearance of arbitrariness in deciding how to handle small group sizes–clarify this in the document,
d) important points that have important influences on the estimates are buried in the document (naming conventions, e.g.),

e) confidence intervals are given in relatively few cases in the report,
f) additional clarifying statements on why the CSFII survey was used could be helpful to those who wish to use the estimates in the Agency ingestion report.

10:47 am **Charge Question 4:** Are the data conventions used to identify direct and indirect water appropriate?

Dr. Petersen summarized her premeeting comments (see Attachment F) on this question. The issue of rounding was raised in this question. Members noted that what ever rounding procedure is used should be explained clearly, otherwise it will not be possible for those who try to replicate your numbers to do so and confusion will result. Additional member comments included:

a) Round to one decimal for percentages, precision implications exist with longer decimal strings,
b) Round once ml/kg/day estimates are made,
c) Clarify what drives the totals estimated,
d) Water loss during preparation is not clearly discussed,
e) QA/QC for the estimate development approach should be conducted,
f) Again, the end use of the estimates make it important to be clear in explaining what has been done to derive the estimates,
g) Clarify that total is direct plus indirect and not inclusive of categories left out of the procedure.

11:10 am **Charge Question 5:** Do the data support estimates of subpopulation distributions?

Dr. Liu summarized his preemeeting comments (see Attachment F). He reemphasized the problem with subpopulation distribution estimates when categories have small numbers of respondents and noted that users may not have confidence in such estimates. He suggested adding guidance to indicate which numbers can be used in assessments and which should not be so used. Other members comments included:

a) Establish a cut point, below which you state that the variance is too large to reflect real levels (AIHC struggled with this problem in labor situations and used a cut point of 6
b) The Native Americans in the survey probably reflect urban tribal members and not those living a “natural” lifestyle,
c) Subpopulation estimates at the fine structure in the report suggests precision in the estimates that does not exist,
d) Fewer tables with higher aggregation and more explanation might help with the problems reflected in the members comments on the too fine level of detail in some of the tables.
e) It is easy to pass the responsibility for care to the users, but those who developed the estimates are closer to the data and could help users better understand the estimates so they won’t be mislead by the implied precision,
f) Users do share responsibility when they use the report,

Dr. Kahn stated that users of these national ingestion numbers need to become familiar with the fine details in the estimating approach in order to understand where the data are useful and where they are not. One needs to be careful about what you infer for small subcomponents of

the overall population.

11:45 am **Lunch**

1:20 pm **Charge Question 6:** We have provided distributions of estimated water intake for numerous subpopulations. Should any additional subpopulations be added? Should any be excluded? Specify subpopulations.

Dr. Fan noted a number of additional subpopulations that would be worth considering. She asked Agency representatives to note those for which the data base was adequate to derive estimates. Member's additional comments included:

a) The data base has a limited ability to provide estimates for sensitive subpopulations,
b) There are no estimates for field workers; these groups drink large amounts of water,
c) Premature babies are high water users on a ml/kg basis,
d) Computing estimates in ml/kg/day terms may be useful since it is commonly used in risk assessment,
e) Fewer age groups in the tables might be better than current fine levels.

Charge Question 7: USDA has identified two types of indirect water in foods. They are:
a. The amount of water in food as consumed.
b. The amount of water used to prepare food.

The water intake report provides estimates of the amount of indirect water in food as consumed. If resources permit, we could expand our report as a future addendum to include estimates of the amount of indirect water used to prepare food. Would this be desirable?

Dr. Bearer noted her comments that are included in the preemeeting compilation (see Attachment F). Ms. Jacobs mentioned that the data base may not support deriving estimates for water used to prepare formula for infants. Another possible estimate of interest would be for water used to wash foods during vegetable preparation.

Charge Question 8: Additional water intake estimates associated with types of food may be useful for specific risk-exposure analyses, e.g., cold beverage intake. Such analyses are feasible using the CSFII data. We could expand our report as a future addendum if resources permit. Are any such targeted analyses of significant interest at this time?

Members noted their uncertainty on this question's intent. Is it a hot-cold issue? Is it intended for some other situation? After a short discussion, Dr. Kahn noted the lack of clarity and suggested that the question was of little use. The question was withdrawn from the charge by Dr. Kahn.

Charge Question 9: Intrinsic water is the water contained in foods and beverages at the time of market purchase. Intrinsic water includes commercial water (added to food products by food manufacturers) and biological water (found naturally in foods). Intrinsic water is not included in our current analysis. If resources permit, we could expand our

report as a future addendum to includes estimates of intrinsic water. Would this be desirable?

Dr. Bearer summarized her comments in the preemeeting compilation (see Attachment F). Additional comments made by members included:

a) Intrinsic water issues may not be an EPA responsibility, so it may not be useful to include,
b) It might be good to approach this from the bottom up by looking at major sources of intrinsic water first–these might be of importance in risk assessment,
c) A general number could be noted up front in the report that could be used–this would remove the need to do quantification for large numbers of foods.

2:40 pm **Charge Question 10:** What are the scientific limitations to the use of the water consumption estimates provided in this report (i.e., what other issues has the Subcommittee noted with the estimates that are not covered elsewhere)?

Dr. Anderson focused on the need in risk assessment to determine which water sources are being used by which people. This is a major limitation of the report so far. The "main source" question in the survey can make this difficult to estimate. Other comments from members included:

a) Describing limitations is dependent on how the estimates will be used,
b) Getting a handle on the confidence in the estimates is important to users– EPA needs to do more to give a feel to users about where in the distribution the estimates fall,
c) Degree of freedom literature may help in this regard, but we are not familiar with the specifics in the literature.

3:04 pm **BREAK**

3:22 pm **Charge Question 11:** The water intake estimates provided in this report are based on all respondents, including those who did not report consuming water during the two survey days. If resources permit, we could also generate estimates of water consumption which exclude the zero consumers of water. We noticed that for some sub-populations, especially the less than one-year-old infants, a substantial proportion consumed zero or minimal amounts of tap water per day (presumably those who were breast fed or drank undiluted formula or milk); these zero consumers of water can contribute to lower estimates. Would this be desirable?

Dr. Bull summarized his comments from the premeeting compilation (see Attachment F) noting it would be desirable to generate additional estimates of ingestion with the zero consumers taken out. Other member comments included:

a) Alternatives to eliminating zero values would be to use a midpoint estimate between zero and the lowest reported ingestion values, or one could simply extend the distribution to derive the estimate–the strategy to use is dependent on the use intended.
b) What the estimates say about common defaults is not clear,

c) Defaults to use in assessments depend on the use they are put to and the basis for defaults used should be clearly stated when one does an assessment,
d) Explaining within category variability would help users.

Water component of sodas made from syrup.

The issue was raised during the telephone conference on July 8. The key is to explain the 10% assumption used in the report. An alternative would be to get data from the appropriate soft drink associations to determine the portion of total soft drinks that are made up of this category.

4:15 pm **Discussion of the Report Format and Writing Assignments**

The Cochairs noted that those assigned to lead writing tasks for each charge question should revise their premeeting submissions on the basis of the discussions during this meeting and additional input from other members who wish to provide information on specific questions. These revisions should be given to the DFO before leaving tomorrow.

The SAB Executive Committee has decided to reemphasize the 'executive summary' and what to highlight there. We will list the highlights for our report tomorrow morning.

A member of the public, Ms. Jeanie Baily, American Water Works Association, asked if the Subcommittee would be advising the agency on the appropriate priority for additional estimates to pursue for the report. The Cochairs responded that the Subcommittee would not be addressing that issue.

4:25 pm The meeting was adjourned for the day

TUESDAY, JULY 20, 1999

8:35 am **The meeting was reconvened.**

Members began the morning by discussing general concerns. These included:

a) The implications of small sample size in some of the subpopulations. There is a need to express confidence limits on the estimates in some way, significant limits to use of the data exist if not,
b) The USDA/NCHS guidance on use of data for specific cells should be considered,
c) The possibility of asking USDA to go to the raw data (if EPA can not gain access to the data itself) and to develop confidence estimates for EPA,
d) One might analyze the data one year at a time to see if variance estimates can be derived.

Report Drafting Session

At this point, members identified, revised, and agreed on the below list of major points to be made in the report to EPA (see Attachment G). These include:
a) Commend EPA for seeking out existing databases to use for estimating national

ingestion

i) The database permits the categorization of various sources of ingested water

ii) The strength of the database is that it is recent, population based, large survey.

iii) The database was able to provide the various major breakdown groups such as age, gender special populations of females, regions, source of water, and the US EPA effort to use it were good.

b) The convention used to estimate the fraction of water in each food as consumed is scientifically defensible.

NOTE: A transition will be constructed by the Cochairs at this point to note the Agency's desire for their report to be merely descriptive and the Subcommittee's advice that this not be allowed to stand. Since assessors could be mislead about the precision of the estimates without further explanation in the document.

c) EPA's goals and objectives for this analysis as stated are too limited.
(This is where we note that the intent to provide only a descriptive report without noting caveats about how it might be used does not work–pointed out the legislative mandate and then backed away from it)

d) The report needs to clearly state that the primary individual data is not the basis for the analysis and this has limited the analysis.

-Note: May want to go to USDA to conduct further analyses using original data

e) A strategy for the analysis of data and presentation and interpretation of the results should be described including an approach for providing quantitative measures of uncertainty and if possible provide a structure for hypothesis testing (i.e., if hypothesis is that less than one-year-old's drink more, why analyze 0-5 years)

Validation and QA/QC

f) Develop a strategy for presentation and interpretation of data (Display the significance of results of the tables..JE has a comment here)

-Drop zeros and replace with dashes

-Do an analysis with and without the nonconsumers

-Data in both ml/kg/day and ml/person/day.

-Interpret both with and without

-More important to divide children by age than adults.

-Precision

g) There are sensitive subpopulations which are not addressed by this dataset–Native Americans on reservations, occupational, etc.(THIS IS TO BE ADDEDD TOO)

h) The current report would be strengthened if it included a sensitivity analysis covering issues such as:

-Internal variability of the data between the two days

-Treatment of non users

-Main source of water (51% and 100% TREATED AS THE SAME)

-Term most inter... 75% some interpreted as 25%
-Further analyses should be prioritized based on sensitivities.
-Major sources of indirect water should be identified and discussed in the report.
-Long term averages are not well addressed by the database

i) Clarify terminology (intrinsic and commercial distinct categories).

k) Further work should involve designing a relatively simple hypothesis and model of the determinants of water ingestion.

l) The analysis should be extended to examine commercial, intrinsic, and water used in preparation of food.

m) The regional models are not appropriate for use in risk assessment because it is likely that the intraregional variability is greater than interregional variability (definition of regions is inadequate).

n) The report needs to clearly state that the estimates of exposure are by the ingestion route only.

o) Use of the analysis for defaults (1 liter for kids –no sense)

p) English logical (lay person) rationale for describing the survey and data analysis to improve its transparency.—clearly articulated verbal description of the logic underlying .

11:40 am **Debrief for EPA Representatives**

The Cochairs as well as, Drs. Evans and Pellizzari, debriefed the Program Office officials on the conclusions of the Subcommittee on its review. Attending for EPA were Drs. Henry Kahn, Rita Schoeny, and Du. Dr. Gary Kayajanian, a member of the public also attended.

The items a) through p) in the preceding section of these minutes formed the basis for the debrief. These will be the beginning of an outline for the Subcommittee's report. Dr. Schoeny noted that the Agency will push forward with revising the report. It hopes to use this in support of the radon risk assessment which is underway.

12:50 pm **The meeting was adjourned**

I certify that these minutes are accurate to the best of my knowledge.

/ S /

Dr. Henry Anderson
Cochairman
Drinking Water Intake Subcommittee

/ S /

Dr. Richard J. Bull
Cochairman
Drinking Water Intake Subcommittee

/ S /

Mr. Thomas O. Miller
Designated Federal Officer
Drinking Water Intake Subcommittee

LIST OF ATTACHMENTS

A EPA Report: *Estimated Per Capita Water Consumption in the United States*
B Federal Register Notice
C Agenda
D Panel Roster
E Sign-in Sheets
F Draft Compilation of Panelist's Premeeting Comments
G Major comments of the DWIS on the Agency report, July 20, 1999
H Clarification of Charge Questions 7, 8, 11
I Question About Soft Drinks
J Appendix C3
K Revised Appendix C3